

Claims

- [c1] An imaging tube coolant volume control system for an imaging tube comprising:
a compensation tank configured to fluidically couple an imaging tube cooling circuit and comprising;
a cooling fluid; and
a compensation-dividing member adjustable in response to change in volume of said cooling fluid;
an overflow vessel fluidically coupled to said compensation tank; and
a compensation valve coupled between said compensation tank and said overflow vessel and allowing flow of said cooling fluid between said compensation tank and said overflow vessel when pressure of said cooling fluid is greater than or equal to a first predetermined pressure level.
- [c2] A system as in claim 1 wherein said compensation tank further comprises:
a cooling fluid side having said cooling fluid; and
a relief fluid side having a relief fluid.
- [c3] A system as in claim 1 wherein internal volume of said relief fluid side is greater than or approximately equal to

a normal operational expansion volume of said cooling fluid.

[c4] A system as in claim 1 wherein said compensation tank further comprises:

a first half; and

a second half coupled to said first half via a pair of flanges.

[c5] A system as in claim 1 wherein said overflow vessel comprises an overflow bag.

[c6] A system as in claim 5 wherein said overflow bag is formed of a material selected from at least one of a polyethylene, a high density polyethylene, Teflon®, and plastic.

[c7] A system as in claim 1 wherein said overflow vessel comprises a relief fluid.

[c8] A system as in claim 1 wherein internal volume of said overflow vessel is approximately equal to or greater than a normal operational expansion volume of said cooling fluid.

[c9] A system as in claim 1 wherein said first predetermined pressure level is approximately equal to 5psi.

[c10] A system as in claim 1 further comprising a pressure

switch preventing operation of at least a portion of an imaging system when pressure of said cooling fluid is greater than or equal to a second predetermined pressure level.

[c11] A system as in claim 1 further comprising a pressure relief device coupled to said compensation tank and relieving pressure of a relief fluid.

[c12] A system as in claim 11 wherein said pressure relief device is selected from at least one of a vent and a pressure relief valve.

[c13] A system as in claim 1 further comprising a pressure relief device coupled to said overflow vessel and relieving pressure of a relief fluid.

[c14] A system as in claim 13 wherein said pressure relief device is selected from at least one of a vent and a pressure relief valve.

[c15] An imaging tube cooling circuit comprising:
an imaging tube vessel; and
an imaging tube coolant volume control system fluidically coupled to said imaging tube vessel and comprising;
a compensation tank configured to fluidically couple an imaging tube cooling circuit and comprising;

a cooling fluid; and
a compensation-dividing member adjustable in response to change in volume of said cooling fluid;
an overflow vessel fluidically coupled to said compensation tank; and
a compensation valve coupled between said compensation tank and said overflow vessel and allowing flow of said cooling fluid between said compensation tank and said overflow vessel when pressure of said cooling fluid is greater than or equal to a first predetermined pressure level.

- [c16] A circuit as in claim 15 further comprising a heat exchanger thermally coupled between said imaging tube vessel and said imaging tube coolant volume control system.
- [c17] A circuit as in claim 16 further comprising a coolant pump circulating said cooling fluid between said imaging tube vessel and said heat exchanger.
- [c18] A method of compensating for a change in volume of a cooling fluid within an imaging tube comprising:
enabling the cooling fluid to expand within a compensation tank of an imaging tube cooling circuit; and
enabling flow of the cooling fluid between said compensation tank and an overflow vessel when pressure of the

cooling fluid is greater than or equal to a first predetermined value.

[c19] A method as in claim 18 preventing operation of at least a portion of an imaging system when pressure of the cooling fluid is greater than or equal to a second predetermined value.

[c20] A method as in claim 18 further comprising relieving pressure of a relief fluid within at least one of said compensation valve and said overflow vessel.